

NETWORKWORLD

THE CONNECTED ENTERPRISE JANUARY 23, 2012

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FIRST LOOK > WINDOWS 8

Windows 8 breaks new ground

Microsoft unifies operating systems from the smartphone to the server. **Page 28** ▶

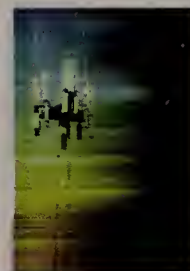
LTE spectrum: How much do the big carriers have?

BY BRAD REED

THE TOP U.S. carriers over the past year have stepped up their efforts to grab more spectrum for 4G wireless data services needed to accommodate an exploding and seemingly insatiable population of iPhone, iPad and other mobile device users.

To get a sense of just how much additional bandwidth carriers will need, consider that Ericsson's most recent Traffic and Market Data report predicted that global mobile data traffic will grow tenfold between now and 2016. What's more, the FCC has projected the nation's wireless carriers will face a 275MHz "spectrum deficit" by 2014 if no new spectrum is opened up for use. Carriers are going to need that spectrum not only to build out nationwide LTE mobile data networks but also to support critical applications such as Voice over LTE (VoLTE)

▶ See **Spectrum**, page 13



RSA, unapologetic, looks to move beyond The Breach

BY TIM GREENE

LAST APRIL'S RSA security breach was engineered by a nation-state whose ultimate goal was not to steal secrets about SecurID tokens but rather to use those secrets to compromise U.S. military contractors that protected their networks with the devices, RSA officials say.

To execute that scheme, the attackers started off by compromising the network of a trusted RSA business partner and used that infiltration to send a spear-phishing email to an RSA employee who fell for the ruse, according to RSA officials talking at a recent meeting with reporters at its headquarters.

▶ See **RSA**, page 14

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Steven Smith
CIO
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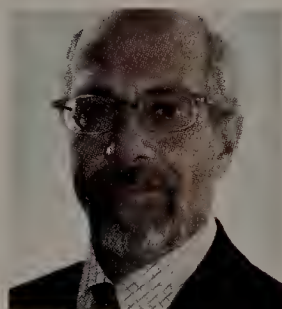
The power to do more

FROM THE EDITOR | JOHN DIX

Out with SOPA, in with cloud

Count us among the critics of SOPA and PIPA, the two ill-conceived bills that were intended to protect American firms against copyright infringement by foreign websites.

We agree with Secretary of State Hillary Clinton, who writes, "There is no contradiction between intellectual property rights protection and enforcement and ensuring freedom of expression on the Internet." But these bills are too loosely defined and could result in a slew of unintended consequences that would be bad for the Internet and bad for business. We need to stop these bills in their track and require more study (see page 34 for Mark Gibbs' take on the Web protests last week).



Now back to our normally scheduled program... We just wrapped up some research on the mega trend that was top of mind in 2011 and will certainly be a big focus here in 2012: cloud computing. Here are a few of the data points that jumped out at me.

Cloud, of course, is already with us. Any company that uses a payroll service or something like Salesforce.com is employing cloud computing, so it comes as no surprise that of the nearly 300 enterprise IT shops surveyed, 55% say they have at least one application supported in a cloud environment.

What is somewhat surprising is these folks say they have already allocated 10% of their budgets to cloud computing (taking into account software, services, training and related costs). Not surprising is that most of them expect this number to climb. Asked what will happen to their cloud budget over the next 12 months, 57% said it will increase while 42% said it will stay the same (1% said it will decline).

There are many potential benefits driving interest in cloud, including the opportunity to drive down costs, but there is a hump to get over. Asked if they anticipate that cloud will save them money in the long-term but drive up short-term costs, 16% of the respondents strongly agreed, 45% agreed, 19% disagreed and 4% strongly disagreed (the rest said they weren't sure or that it wasn't applicable).

Part of the problem, they say, is the contract process. When we posed the statement, "Cloud vendor contracts aren't structured to allow us to easily evaluate costs and/or ROI," 14% strongly agreed, 39% agreed, 23% disagreed and 3% strongly disagreed (some 18% weren't sure and 3% said it didn't apply to them).

And finally, when asked if "the IT networking function has had to rapidly expand its skill set to keep up with cloud computing developments", 21% strongly agreed, 46% agreed, 22% disagreed and 4% strongly disagreed (the rest were unsure or it did not apply).

We'll explore these and other issues in our ongoing Enterprise Cloud Services supplement series throughout 2012.

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CES 2012 takeaways

➔ "LTE IS NOW a must for smartphones"? Tell that to Apple, whose iPhone sales, and customer satisfaction, seem to be doing quite well without the questionable benefit of this battery-sucking feature (Re: "5 key takeaways from CES"; tinyurl.com/7y6gffo).

There's no question that high data rates are desirable, but everything involves a tradeoff. Today's 4G chipsets are power-hungry.

immovable object

What is 'censorship'?

➔ THE IDEA OF censorship is not contingent on whether or not someone powerful, weak or anywhere in between is silencing someone else powerful, weak or anywhere in between. Neither does it matter whether it is a government attempting to silence, intimidate and control, or whether it is some other third party that attempts to accomplish the same thing (Re: "Stratfor CEO's 'censorship' rhetoric all wrong"; tinyurl.com/6pkb589).

You are correct that Stratfor hasn't been censored, but had Stratfor gone out of business and its particular viewpoints and analysis been completely eliminated from the media's voice, then that would effectively have been successful censorship.

Mickey Palea

➔ SO MANY PEOPLE seem to be unable to recognize the difference between a criminal, whose use of coercion is by definition wrong, with government, whose use of coercion is, by its definition, right.

Breaking and entering is not censorship. Just because the breaking and entering happened on computers and networks, rather than (physical) windows and side-walks, makes no difference. Censorship is an act of authority, not of criminals.

Bob Robertson

➔ THIS IS A semantic argument in some ways. Lets get rid of the "censorship" term then. It still amounts to shutting up an opposing opinion through vigilante justice. There is no open discourse and no

chance to defend yourself before this happens. Just like governments, hacktivists can persecute the wrong entity.

So it's not censorship, but that doesn't make it the morally right course of action.

Bymynishus

Goodbye NTFS, hello ReFS

➔ WHAT WILL THIS mean for CIFS (Common Internet File System)? Don't we already have enough file system architectures? We haven't yet digested ZFS and now NTFS is going to be replaced with ReFS (Re: "Exit NTFS, Enter ReFS"; tinyurl.com/7x85fe3).

Why does Microsoft feel it needs to introduce Yet Another File System Architecture (YAFSA)? I already have to deal with IBM DFSMS, IBM zFS, HFS, HP LVM, Veritas VxFS, Solaris ZFS, CIFS and NTFS.

Steven D. Brown

IBM takes on Moore's Law

➔ IMAGINE THAT A solid state drive using this material and the latest interface technology could offer what we would consider unlimited storage. Redundancy inherent in that capacity as native, and no loss of capacity or failure because of the methods we use today to create SSD technology, would create a drive to store all your data and fit it in an indestructible, portable pen drive, for only \$30 (Re: "IBM smashes Moore's Law, cuts bit size to 12 atoms"; tinyurl.com/7ngh27s).

That's the order of magnitude I think this technology represents. IBM's research is a milestone that is on par with the x86 processor. Impressive; but more impressive would be if HP or Dell started ramping up for manufacturing.

James Fox

➔ CONSIDER THE RAMIFICATIONS for the builders of storage media. This has to reduce their sales volume by at least an order of magnitude. This is similar to what happened to mainframe business after the microcomputer.

Jack Hines

Why does Microsoft feel it needs to introduce Yet Another File System Architecture (YAFSA)?

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Apple schools textbook publishers

APPLE LAST WEEK brought traditional textbooks to the digital age with the new iBooks 2, a tablet application designed to create a more interactive and engaging learning experience. At an event held in New York, Apple used the rich layout features on the iPad to demonstrate a biology digital textbook with multimedia features that allowed students to view 3D images, animations and video. Students can zoom and pinch their way to relevant content, and seamlessly move from one page to another. The

company is starting with high school textbooks, which will sell for \$14.99 or less, from Pearson, McGraw-Hill, and Houghton Mifflin Harcourt.

New textbooks can be created with iBooks Author, a free Mac application to author digital textbooks. Apple also introduced the iTunes U app to help teachers deliver content to university students. The app helps deliver full courses with video, documents and books, and students are able to view the syllabus and all assignments.

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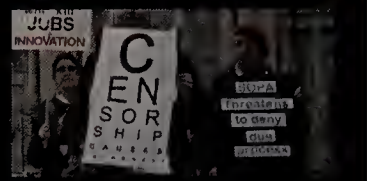
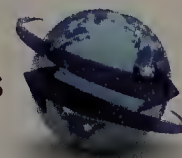


Full steam ahead for gigabit wireless

UPTAKE OF gigabit wireless networks based on 802.11ac is expected to surge when the first products arrive later this year. Chipsets and routers were demonstrated at this month's Consumer Electronics Show, and it won't be long before more laptops are shipped with 802.11ac than without, according to Filomena Berardi, senior market analyst at IMS Research, which estimates that 3 million products with 802.11ac will be shipped in the first year of availability. The upcoming 802.11ac standard delivers higher speeds than 802.11n by using wider and more radio channels and more advanced antenna technology. But the performance improvements will come at a cost. Enterprises will have to buy new clients and access points, as existing Wi-Fi chipsets can't be upgraded to handle 802.11ac. **tinyurl.com/83acyx**

U.S. losing high-tech jobs, R&D dominance to Asia

U.S. COMPANIES are locating more of their R&D operations overseas, and Asian countries are rapidly increasing investments in their own science and technology economies, the National Science Board reported last week. The number of overseas researchers employed by U.S. multinationals nearly doubled from 138,000 in 2004 to 267,000 in 2009. On the education front, the U.S.



IT VIDEO

Silicon Valley rallies against SOPA

During last week's SOPA protests online, about 200 people in San Francisco rallied against legislators for considering SOPA and PIPA. Craig Newmark, the founder of Craigslist, echoed the feelings of the crowd — SOPA and PIPA would shut down websites within Silicon Valley. **tinyurl.com/76658lv**

accounts for just 4% of undergraduate engineering degrees awarded globally, compared to China (34%), Japan (5%), and India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand (17% collectively). "The low U.S. share of global engineering degrees in recent years is striking; well above half of all such degrees are awarded in Asia," NSB said in its report. **tinyurl.com/7bytvhk**

LightSquared claims GPS tests were rigged

WOULD-BE CELLULAR carrier LightSquared claims the company's mobile data network was set up to fail in GPS interference tests that were conducted last November under government auspices. Makers of GPS equipment put old and incomplete GPS receivers in the test so the results would show interference, LightSquared executives said on a conference call with reporters. The charges fleshed out a series of claims by the company that the approval process for its LTE network is unfair. LightSquared is seeking a waiver from the FCC that requires all harmful interference with GPS to be resolved.

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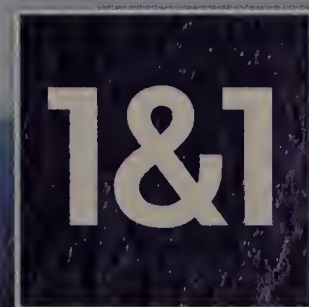


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GOOD BAD UGLY

CES celebrates

EXPECTATION LEVELS were set low for the CES International 2012 event in Las Vegas, which doesn't have Apple as an exhibitor and had announced recently that Microsoft would be making its farewell appearance this year. But the show went on and exceeded expectations, drawing a record 153,000 attendees and 3,100-plus exhibitors, and generating oodles of buzz for UltraBook laptops, scads of new smartphones, futuristic televisions. What's more, the celebrities (Justin Bieber! Snooki!) still came.



good



bad

Remote robbery

CRIMINALS IN South Africa have carried off a cunning remote access heist that has left one of the country's banks nursing a stunning \$5.2 million loss. After opening accounts at the South African Postbank months in advance, between Jan. 1 and 3 the

gang remotely accessed the computers of two employees using valid logins which were linked to the money transfer system. Large sums of money were then moved to the mule accounts before being withdrawn from ATMs across the country as cash. The transfers were apparently not picked up by the internal fraud detection system. The *Zambian-based Sunday Times* newspaper quoted an unnamed source who pointed the finger at IT. "The Postbank network and security systems are shocking and in desperate need of an overhaul. This [the bank theft] was always going to be a very real possibility," the source said. (From Techworld.com)

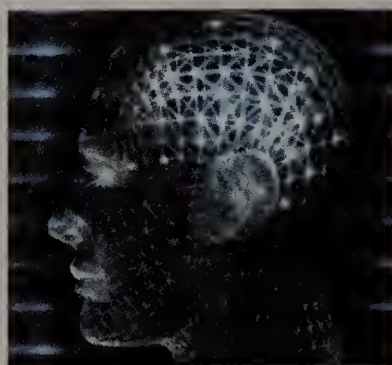
Hackers targeting Macs

NEW MAC-BASED security threats jumped in 2011, but still remain far below that of Windows PCs, according to F-Secure Labs. A total of 58 unique variants were detected from April through December, according to the Labs' Threat Research team. Nearly half, 29, were Trojan-downloaders, which F-Secure defines as a type of Trojan horse program that secretly downloads malicious files from a remote server, then installs and executes them.



ugly

The FCC is working with the National Telecommunications and Information Administration to evaluate the interference problem. tinyurl.com/7tay9k8



Business intelligence back on top of CIOs' minds

BUSINESS INTELLIGENCE and analytics have again become the top technology priority for CIOs, according to a Gartner survey of 2,335 CIOs. BI lost the top spot on Gartner's list to virtualization in 2010, but returned this year. "I think it dropped off the top for a couple of years because expectations [for BI] were really high, and they weren't really met," said Dave Aron, a vice president at Gartner. Companies became disillusioned about BI, but now it's making a comeback as trends such as big data and social networks highlight increasing opportunities for business analytics, according to Aron. Two other areas that continue to keep CIOs up at night are mobile technologies and cloud computing, which are in second and third place on this year's list, compared to third and first place last year. tinyurl.com/6r2k3n3

Surging mobile use creates big security headaches

AN EXPLOSION of personal mobile devices on corporate networks is creating security

headaches for the enterprise, according to a new survey. Among 768 IT professionals polled by Check Point, 65% said their companies allow personal devices to connect to corporate networks, and 71% said mobile devices have "contributed to increased security incidents." Employee behaviors are a key part of the security problem: 47% say customer data is stored on mobile devices; 72% say careless employees are a greater security threat than hackers; and "lack of employee awareness" of corporate security policies ranked as having the greatest impact on mobile data security. tinyurl.com/7h55lx

SOPA alternative introduced

LAWMAKERS OPPOSING the controversial Stop Online Piracy Act introduced alternative legislation in the U.S. House of Representatives on Jan. 18, the same day many websites went dark in opposition to SOPA and the Protect IP Act. The Online Protection and Enforcement of Digital Trade (OPEN) Act would allow copyright holders to file complaints about copyright infringement at foreign websites with the U.S. International Trade Commission, which would investigate the complaints and decide whether U.S. payment processors and online advertising networks should be required to cut off funding. By contrast, SOPA would allow the U.S. Department of Justice and copyright holders to seek court orders requiring payment processors and ad networks to stop doing business with foreign websites accused by the plaintiffs of copyright infringement. Opponents of SOPA and PIPA say the bills don't give owners of foreign websites enough due process and could cut off legitimate free speech on websites that have a mix of content. tinyurl.com/6psr330

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How to profit from new domain name rules

BY DIRK A.D. SMITH

A NEW era in website naming has begun, providing a golden opportunity for savvy IT professionals to go on the offensive with new domains that can capture additional Web traffic and generate new revenue.

Under today's rules, names are available in 280 well-known categories, such as .com, .gov or country codes, like .de for Germany. Under the new rules, the Internet Corporation for Assigned Names and Numbers (ICANN) is accepting (between now and April 12) applications for new generic top-level domains (gTLDs), possibly as many as 1,000. Examples of possible new domains are cities and regions (.paris), domains tied to specific interests (.music) or domains tied to companies and brands (.motorola).

According to Jeremiah Johnston, general counsel at domain name reseller Sedo.com, "Savvy network administrators can demonstrate added value to their company because they know how to have ancillary domain names forward-capture traffic to the primary domain name and how to track that traffic. When the company then sees thousands of people coming to these other domains who are then forwarded to pages where they can actually take an action that generates revenue for the company, the company sees the profit in this remarkably under-leveraged strategy."

Known as a domain name portfolio, this use of a collection of domain names enables the capture of Internet traffic that would not normally make it to the organization's website.

Word in the domain name market is that companies like Amazon, Sony and Johnson and Johnson have portfolios in the range of 500, 2,000 and 20,000, respectively. However, the size of the operation is irrelevant when considering a portfolio, as small business operator Joe Nazar explains.

In 2007, he launched San Francisco Whale Tours with a single boat. One year into operations he realized his new enterprise needed more than a sign on Fisherman's Wharf to capture traffic. After seeing a Go Daddy commercial on Super Bowl Sunday 2008, he called the company. What followed became an ongoing relationship that helped him select a primary domain name, build a website and, over time, go much further.

Seeing leads come in through the Web from a single name, the Internet-newbie began acquiring ancillary names to capture missed traffic from misspellings, different extensions, geo-domain names related to the Bay

How to win the domain name game

1. Promote and protect

Select names that promote traffic and protect your brand from abuse.

2. Monitor with metrics

Check the traffic statistics for each name both before and after acquiring them.

3. Lose the losers

Cull unproductive names that capture little traffic or traffic that does not turn into sales.

4. Direct the redirects

Periodically check that each name set to redirect traffic is doing so and to the proper places.

5. Check on changes

As you add, change or drop products and features, add, redirect or drop names as needed.

Area and keywords relating to his new niche. The now Internet-savvy businessman owns more than 200 domain names.

As Nazar explains, "The for-sure sweep is to cover all scenarios — .com, .info, .mobi, .net and .org — and redirect that traffic to your website using a 301 Redirect Page then watch the stats. So let's say a name catches 150 people in a month some of whom buy tickets. ... That can translate to thousands of dollars for something costing \$11 a year."

A well thought-out portfolio includes a selection of primary names and capture names, both described below.

Primary names

The primary domain name, often the only name owned by a company, is whatever best approaches the actual business name. Typically it is comprised of the company name plus an extension, i.e., CompanyName.com.

Your primary domain name is not likely to capture all attempts people make to find you or what you offer. Grabbing additional names that rein in missed searches can dramatically increase traffic.

Capture names

The following is a list of some capture domain name types:

■ **Abbreviated domain names:** Internet users often shortcut their path to a company's site by typing an abbreviated name into the address bar. Expecting this, many companies nab those addresses. For example, Barnes and Noble owns www.BN.com which automatically takes you to its primary name www.BarnesandNoble.com while www.MS.com takes you to www.MorganStanley.com. Others use it in reverse: General Motors has www.GeneralMotors.com which automatically takes you to www.GM.com, and www.GeneralElectric.com takes you to www.GE.com.

■ **Keyword domain names:** To capture searchers who may not know your company or its name, keywords are particularly valuable. This is because people have adopted the habit of typing words into the address bar and sticking a .com on (or other extension) and seeing what comes up. Type in www.Shoes.com and you get a site owned by a subsidiary of The Brown Shoe Company. It may be an old company that has been making and selling shoes for more than 130 years, but it is very modern in its development of a domain name portfolio having a host of names, including www.BrownShoe.com. However, it appears someone else nabbed the singular www.shoe.com. So, while many such keywords are taken, try combining keywords with other keywords or with your company name.

■ **Geodomain names:** Geodomains are the actual names of geographic places such as countries, states and cities, such as England.com California.com and Tokyo.com. (Note that these do not include geographic subdomains such as .uk, .us or .jp.) Such names are typically expensive. England.com sold for \$2 million in 1999 and Branson.com (a city in Missouri) sold for \$1.6 million in 2006.

But the new ICANN rules offer an opportunity to create completely new domains. And you can always combine the geographic name with a keyword or a company name, as Bice's Florist did when it acquired FortWorthFlowers.com, and as Lovering Volvo in Nashua, N.H., did when it acquired LoveringNashua.com. Just last month, VisitCuba.com sold for \$100,000.

Maintenance of your domain name portfolio is also critical. The most important aspect is simply not letting valued names expire. Another key point is to monitor the stats and cull the dead wood. ■

Smith is president of Alexander LAN Inc., a freelance consultant and writer in IT. He can be reached at DirkADSmith@gmail.com.

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MacIT puts enterprise shine on Apple platforms

iOS, Mac mobility a major theme for Macworld spinoff

BY JOHN COX

APPLE'S PRESENCE has exploded in the enterprise, thanks to fast and wide adoption of iPhones and iPads. The annual Macworld|iWorld show in San Francisco next week for the first time is offering a separate conference, MacIT, dedicated to this unlikely success.

Over the past decade, Macworld has treated enterprise Apple deployments as one track or theme of presentations in the conference. This year, MacIT will run at the same time and location, the Moscone Conference Center, but have its own conference sessions, venue and vendor exhibition space.

Macworld itself has been renamed "Macworld|iWorld," to reflect the rise of Apple's mobile OS and the devices that use it. Both events are run by IDG World Expo, a unit of IDG Communications, the parent of *Network World*.

"Enterprise professionals can now access MacIT's technical agenda without having to navigate through the more general Mac and iPhone 'how-tos' that we offer in the Macworld|iWorld event," says Paul Kent, general manager for the conference.

Over three days, starting Jan. 26, MacIT will offer attendees nearly 40 sessions, presented by a mix of IT professionals overseeing Apple deployments, consultants working directly with enterprises on such projects and vendors targeting this market. The conference is expecting 400 to 500 MacIT attendees, about a 60% increase over 2011.

Sessions include a variety of end user case studies, plus a focus on digital certificates for Apple clients, Apple tools for iOS 5 deployment and management, remote and virtual desktops, deep dives into OS X Lion and Lion Server and tips on large-scale OS X and iOS deployments.

Though Apple has been setting Mac sales records, its real enterprise success in the past few years has been via its iOS mobile platform. And the MacIT conference's main themes this year reflect that, according to Kent, who points out a focus on topics such as mobile device management, mobile security, best practices in device deployment and enterprise mobile app development.

"In my experience, Apple has been experiencing greater penetration into the enterprise, and that penetration has been largely driven by iOS devices, iPhones and iPads primarily,"

says Benjamin Levy, principal with Solutions Consulting, an IT consultancy. "The iPhone and iPad are the best current implementations in their respective markets and it's impossible to tell a C-level executive that she or he can't use the device that gives them the best user experience and works within their existing infrastructure. The traditional arguments about an inability to manage the assets no longer hold water and previous IT department intransigence isn't being tolerated."



Mac numbers rise in the enterprise

Apple's U.S. market share for the quarter ended Sept. 30 jumped from 10.5% to 11.3%, according to IDC. And Apple's global Mac shipments increased by 20%. Gartner puts Apple's U.S. market share at 12.9%, with a 21.5% growth in PC shipments.

Levy is part of a MacIT panel talking about "Putting Business First, Technology Second," which looks at the issues of technology management to meet business needs, focusing on iOS-based mobile deployments.

At the same time, IT groups are discovering that iOS and its frameworks, APIs and tools add up to a stable, mature operating environment for enterprise users and IT.

For iOS, Apple offers the iPhone Configuration Utility, which also works on iPads, and tools built into OS X Lion Server via the Profile Manager, says Randy Saeks, network manager for Northbrook/Glenview School District 30, Northbrook, Ill. "These allow you to manage the device settings but not the content so much," he says. "iPhone Configuration Utility is really a one-time configuration since any changes to settings need to be reapplied via profiles."

Beyond the tools, Apple's APIs energize a healthy third-party software market. "[T]he real benefit is seen through the Mobile Device Management framework Apple has developed," according to Saeks. "This framework allows other companies to develop products with some really neat features that Apple

presently does not have in its own products."

"For large enterprises, I know of at least 30 third-party mobile device management solutions from big name companies, so enterprises don't have to roll their own," says Derick Okihara, IT technician for Mid-Pacific Institute, a Honolulu, Hawaii, private coeducational college preparatory school, for preschool through 12th grade. "The biggest challenge might be choosing the right MDM solution for your organization, since there are so many."

There are a couple of areas that could be improved by Apple, according to Saeks. "The main areas that I see for improvement are for the initial configuration, similar to imaging or deployment, and for pushing out applications," he says.

Saeks is speaking at MacIT on "Apple Tools for iOS 5 Deployment and Management." Okihara is talking on "Mobile Device Management for iOS and OS X."

By contrast to the pervasive presence of iOS, even in Microsoft-based enterprises, Mac OS X has much less penetration, and IT groups often have little idea of what the platform, and its third-party software partners, can actually do, Levy says.

"For the Macintosh, Apple has Mac OS X Server and Apple Remote Desktop, both of which can scale quite large and are very powerful," he says. "Their combined power is excellent, and Mac OS X Server includes Mac OS-specific features like Software Update, NetBoot and NetInstall. There are also a host of third-party tools that can handle granular control over every aspect of the Mac OS X experience from vendors like JAMF and Absolute." ■

► **Spectrum**, from page 1

and eventually move to LTE-Advanced, the next generation of LTE that's projected to deliver average download speeds in the 100Mbps range.

AT&T's failed \$39 billion acquisition of T-Mobile was all about gaining more spectrum for its 4G LTE network, as were Verizon's nearly \$4 billion in recent deals to purchase spectrum licenses from big cable companies including Cox, Time Warner and Comcast.

Mark Lowenstein, the managing director for consulting and advisory firm Mobile Ecosystem, says that getting significantly more spectrum would allow carriers to promote LTE not just as wireless technology for smartphones and tablets but for high-definition video services as well. Or put another way, while it would be impractical to stream Netflix movies on your Xbox using LTE right now, it might not be that impractical in the future when carriers have significantly more spectrum to play with and can thus charge less money for high data consumption.

"As a result of trying to manage the spectrum they have, wireless carriers have kept their 4G pricing relatively conservative," he says. "Significantly more spectrum will allow them to be more aggressive with regard to video."

But while the carriers are scrambling trying to get more spectrum for their LTE networks, it's useful to step back and examine just what spectrum they already have and what they'll need in the future to deliver ubiquitous 4G service across the United States as mobile users seek to view and exchange more video and other bandwidth-hogging content.

700MHz band: the Park Place and Boardwalk of mobile data spectrum

In general, LTE networks run on frequencies in the 700MHz to 2.5GHz range, though spectrum on lower frequencies is preferable for carriers since it can maintain signal strength over longer distances, meaning carriers can cover more people while building less infrastructure. With this in mind, you can see why Verizon and AT&T were so aggressive in bidding for spectrum on the 700MHz band that

had previously been used for broadcasting UHF stations before the FCC opened it up for auction in 2008. In total, Verizon bid \$4.7 billion for the rights to operate on the so-called "C Block" of the 700MHz band while AT&T spent \$6.64 billion to operating on the so-called "B Block" of the same band.

According to Baird Equity Research analysis, Verizon is the winner when it comes to spectrum depth on the 700MHz band. Baird calculates spectrum depth by taking the total amount of MHz a carrier has on a particular spectrum band and multiplying it by the fraction of the total U.S. population that the band covers. In other words, if a carrier has 20MHz of spectrum that covers two-thirds of the U.S. population, Baird will report it as having a spectrum depth of 13.3MHz.

Verizon currently has a spectrum depth of 29MHz on the 700MHz band, significantly more than the 16MHz of spectrum depth that Baird reported was held by Verizon's closest competitor, AT&T. Baird's analysis was conducted before the FCC officially signed off on AT&T's agreement to purchase an additional 6MHz of nationwide spectrum on the 700MHz band from Qualcomm, so the carrier's spectrum depth right now is around 22MHz nationwide. No other service provider has anything close, as only Dish Network (5MHz of spectrum depth and a possible AT&T buyout target) and U.S. Cellular (3MHz of spectrum depth) have any amount of spectrum depth exceeding 1MHz.

AWS spectrum also a hot commodity

Even though Verizon and AT&T have gobbled up most of the 700MHz spectrum, that hasn't stopped them from trying to expand their potential LTE spectrum portfolios through acquisitions of spectrum on the Advanced Wireless Services (AWS) band that spans from 1710MHz to 1755MHz for uplink and 2110MHz to 2155MHz for downlink. This was particularly true with AT&T's attempt to acquire T-Mobile, which boasts the most AWS spectrum depth in the entire country with 24MHz. Now that the merger has failed, AT&T has agreed to compensate T-Mobile by transferring it around 7MHz of its own AWS spectrum.

Meanwhile, Verizon has slipped into the AWS spectrum driver's seat by relatively quietly signing a \$3.6 billion deal with SpectrumCo, a joint venture of cable companies Comcast, Time Warner Cable and BrightHouse Networks, to purchase 20MHz of its AWS spectrum licenses. Verizon further shored up its AWS spectrum position when it paid Cox Communications \$315 million for licenses of 20MHz of AWS spectrum.

► See **Spectrum**, page 16

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► **RSA**, from page 1

The company hosted a media day to air out the breach in an attempt to put it behind them before the RSA 2012 security conference that starts Feb. 27, and to shift focus to its upcoming product road map. During the session executives talked about the breach in some detail, characterizing it as an unfortunate incident that has valuable lessons for any organization.

If breaking into a military contractor's network was the ultimate goal of the RSA breach, the attackers were successful. RSA CEO Tom Heiser says the breach of Lockheed Martin's network in May was made possible at least in part by the stolen RSA secrets. But, he says, that is the only known breach attributable to the theft. "There is no one [else] we know of that's had an active attack due to RSA, period," he says.

After an initial frantic time spent explaining to customers what happened and what to do about it, the company shifted to try to meet customer demand for new tokens despite RSA's belief that they weren't necessary. To do so they put in place half a dozen or so new robots, boosting production sevenfold, he says.

Heiser seemed exhilarated recounting how the company responded to the breach, calling on teams of engineers to answer questions and setting up a network of executives around the world to answer questions no matter the time of day.

Initially the company did triage — "to stop the bleeding" and address customer needs and the safety of their networks — but during the summer shifted to the offensive. It set up Project Phoenix designed to put the focus on advanced threats like the one it fell prey to, setting up 15 to 20 small conferences around the world since then to discuss the problem, Heiser says.

He says the satisfaction of customers lagged after the breach when they were mainly upset about the problems it was causing them. Now, though, customers are committed to RSA products for the long term, he says. The company claims a net gain in customers since the breach.

Angry customers said immediately afterward that they weren't getting enough information from RSA and that in order to get it had to sign nondisclosure agreements.

RSA Executive Chairman Art Coviello tries to put a rosy complexion on the impact of the breach. He claims RSA lost "not a single significant customer" as a result. "There was virtually nonexistent churn that we've been able to detect," he says. Overall, the company has about 35,000 SecurID customers.

The key to retaining customers affected

by the breach is getting one-on-one meetings with them to explain what happened, Heiser says. When those happen, customers cool down and are willing to stick with the company, Heiser says.

Coviello says the company demanded the NDAs that rankled some customers so any information they might hear would not wind up in the hands of hackers.

Information about the breach that the company released to customers might have left them unsatisfied, but since only Lockheed has been affected, it seems to have been enough to mitigate the risks, he says. "I'm hard-pressed to see what we could have done differently," he says. "If you have a vulnerability in software, do you announce to everybody that it exists or do you quietly fix it?"

Coviello says customers may be disconcerted but decided to stay with RSA and SecurID, at least in part because of the investment they have already made. They are convinced the technology still works and can see expanded roles for it as they roll out new infrastructure such as virtual desktops, he says. The company says it has a net increase of 1,000 new SecurID customers

since the breach.

Coviello says the attack on RSA started at a company RSA did business with. "That environment was compromised specifically to get at us," he says. The long time frame for executing the attack indicates the attacker was a country as opposed to independent criminals. "We think we were attacked to get at the industrial-military base," he says.

He has no smoking gun for what nation was behind the attack because it's extremely difficult to trace the ultimate source of the attack and destination of the stolen data. "The trail gets cold very quickly," Coviello says. "I don't make any kind of assertion I can't back up with fact."

RSA did identify the employee who clicked on the malicious email attachment that launched the attack, but no punishment was meted out to that employee, he says.

The RSA attack was the start of 20 highly publicized attacks last year, says Dan Schiappa, senior vice president of identity and data protection. "That's the new world we live in," he says. "Before, attention was paid if your company was breached; now attention is paid when anybody is breached." ■

— Tim Greene

RSA to focus on mobile, cloud security

Beyond addressing details about its big breach of 2011, RSA Security executives last week outlined its 2012 product strategy that is centered on three areas: mobility, anti-threat and cloud security.

To help businesses better protect data on personal mobile devices, the company is shooting for tools to separate personal data and corporate data and to improve authentication to content accessed through those devices.

The road map calls for increasing the number of factors in multi-factor authentication by adding geolocation, biometrics and patterns of behavior, and applying them based on individual circumstances.

This scheme calls for embedding SecurID technology in mobile phones. The company says partnerships with chip makers will protect secrets such as passwords and encryption keys at a hardware level so if devices are compromised they won't yield them to attackers.

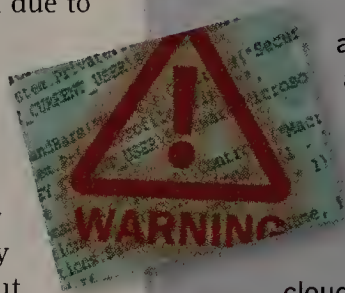
Anti-threat efforts will give businesses visibility into what devices are being used for as well as avenues for sharing threat intelligence with other businesses, governments and information-sharing organizations.

This plan will require analytic software that can mine enormous amounts of data for actionable intelligence. The company promises an announcement in this area at the RSA 2012 conference next month.

RSA's cloud efforts include Pegasus, a project dedicated to moving the functionality of RSA's current products to cloud environments where they could be sold as services.

The company also is working toward incorporating security in the gear used to build service-provider infrastructure to ensure that cloud services can meet security standards set by businesses as well as governments. This includes the federal push for agencies to hire certified cloud providers rather than build their own infrastructure.

It also includes RSA's contribution to VCE, the joint venture of VMware, Cisco and RSA's parent company, EMC, which collaborates to build Vblocks, bundles of data center hardware and software.



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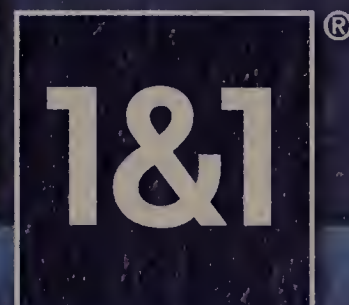
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► **Spectrum**, from page 13**Sprint plans to use PCS, iDEN spectrum**

As usual, Sprint is the oddball among the major U.S. carriers. Although it has no holdings on the 700MHz band, Sprint does have 15MHz of spectrum depth on the 800MHz band and 34MHz on the PCS band (1850MHz-1915MHz, 1930MHz-1990MHz) that it plans to use to support its own LTE network.

The spectrum on the 800MHz band has up until recently been an albatross around Sprint's neck since it had to use the band to support the iDEN network it inherited from its acquisition of Nextel in 2005. But with Sprint due to completely phase out the iDEN network by next year, the spectrum has suddenly become free for use. Sprint has more depth on the PCS band than on the 800MHz band, although this spectrum is at a much higher frequency and thus won't propagate as well as the former iDEN band.

Sprint is also relying on partnerships with other carriers more than its rivals at Verizon and AT&T. This past summer Sprint struck a deal with wireless broadband and satellite network provider LightSquared to deploy and operate a nationwide LTE network that will use a 40MHz chunk of spectrum on the 1.6GHz band, also known as the Mobile Satellite Service (MSS) L-Band. (Although LightSquared has been embroiled in a life-or-death struggle with federal regulators over whether its technology will pass muster.) Sprint has also long partnered with Clearwire in deploying and operating a mobile WiMax network on the 2.5GHz (BRS/EBS) band, so Sprint could get access to even more spectrum for LTE services if Clearwire is actually successful in building out its own LTE network on the band.

So what's the bottom line?

OK, so we know that Verizon and AT&T are the big players in terms of prime LTE spectrum. But leaving aside 700MHz, AWS, PCS and all the other spectrum bands that the carriers could use in the future, let's talk about which carrier has the most overall spectrum ready for LTE use right now.

Analysis released by UBS earlier this month found that while Verizon and AT&T have comparable total spectrum holdings, Verizon simply blows away AT&T when it comes to spectrum already available for LTE use. According to UBS, Verizon has an average of 62MHz of spectrum available for LTE use today in the top 100 U.S. markets while AT&T has an average of 37MHz of spectrum available for LTE use in the top 100 U.S. markets. AT&T's trouble is that, despite having

roughly the same overall spectrum holdings as Verizon, the company is still using a lot of its spectrum for its legacy 2G services. This in part helps to explain why AT&T has been behind Verizon in terms of overall LTE deployments. As of this month, Verizon has rolled out LTE in 195 markets covering 200 million points of presence while AT&T has set up LTE in 26 markets covering 74 million POPs.

UBS analyst John Hodulik says it will take AT&T some time to migrate its 2G users away from its spectrum on the PCS and cellular bands, but he also says AT&T will be in a comparable LTE spectrum situation to Verizon once it frees up those frequencies.

"The cell and PCS spectrum they've got is being used for 3G and 2G services," he says. "Over time there's no reason they can't re-form some of that 2G and 3G spectrum and use it for 4G."

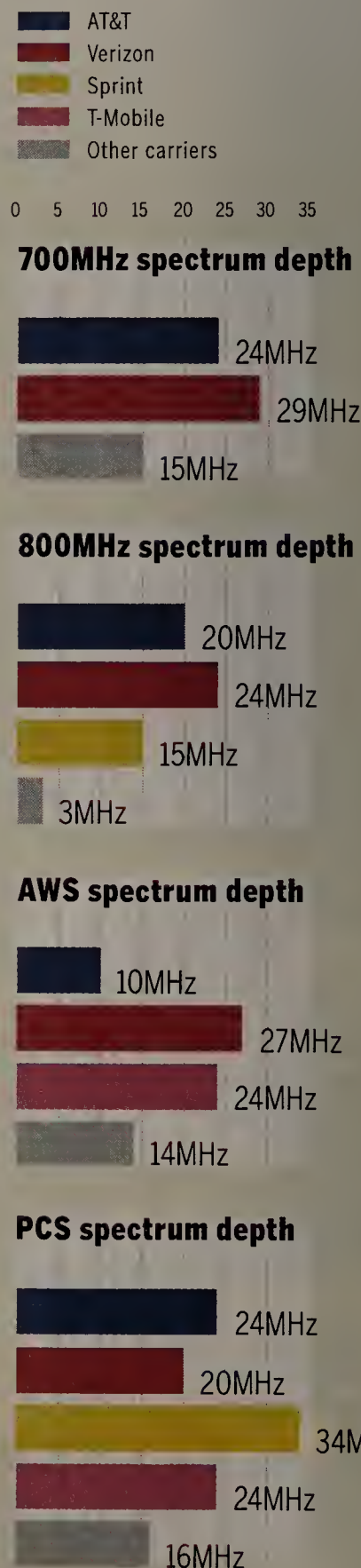
Joan Marsh, a vice president of federal regulatory affairs at AT&T, says while AT&T has enough spectrum to run a strong nationwide LTE network in the long run, the company wanted to merge with T-Mobile to acquire "spectrum that will support depth while our customers migrate to 4G." Marsh adds that "There's a sunset plan for our 2G network but it's a multiyear process."

So now that the T-Mobile merger has died, AT&T will be at a disadvantage when it comes to LTE spectrum depth until it can migrate its users away from its 2G services. Help may be on the way, however, as the FCC has set a goal to make 300MHz of spectrum available for wireless broadband use over the next five years with the eventual goal of freeing up 500MHz of spectrum by the end of 2020. The FCC has said that it could reach 300MHz by reallocating 120MHz of spectrum currently used by television broadcasters, with 90MHz coming from mobile satellite providers, 10MHz coming from the 700MHz "D Block," 60MHz coming from the AWS band and 20MHz coming from the Wireless Communications Service band.

But with no progress made in Congress yet on setting up spectrum auctions for wireless broadband, it seems the carriers will have to make do with what they've got for the foreseeable future. ■

CARRIER SPECTRUM DEPTH

Where the big carriers stand on 700MHz, 800MHz, Advanced Wireless Services (AWS) and Personal Communications Service (PCS) spectrum bands, which are all being put to use to support burgeoning 4G LTE networks.



All data provided by Baird Equity Research and the Federal Communications Commission. Spectrum depth calculated by multiplying the total amount of MHz a carrier has on a particular spectrum band by the fraction of the total U.S. population that the band covers. Includes Verizon spectrum acquired through SpectrumCo and Cox Communications and AT&T spectrum acquired through Qualcomm. Excludes spectrum AT&T will have to cede to T-Mobile.

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Adopt IPv6 soon or be sorry later

Adozen of the world's largest Internet companies — including Facebook, Google and Comcast — have committed to June 6, 2012, as the start date for their production deployments of IPv6, an upgrade to the Internet's main communications protocol. The announcement last week of their plans was coordinated by the Internet Society, which is organizing the World IPv6 Launch event and encouraging other ISPs and Web content providers to participate in it.



Network World's Carolyn Duffy Marsan spoke with Leslie Daigle, the Internet Society's chief information technology officer, about the significance of the World IPv6 Launch event and what enterprise IT professionals should be doing about it. Here are excerpts from their conversation:

Why is World IPv6 Launch significant?

It's a significant marker to lay down that there are real commercial IPv6 services on the content front and on the access front and in terms of the important pieces that are needed for IPv6 including content delivery networks (CDN) and the customer premises equipment (CPE) vendors. This is not just another trial. It's not a test flight. It's turning it on for real.

But the June 6 date is more of a start date than a deadline for IPv6 deployment, isn't it?

It's a target so that by that point the participants have agreed to start their production deployments. This comes back to last year, when we had a test flight to make sure that the world could actually deal with having dual-stack IPv6 and IPv4 services for content providers. This year, it's really time to stop talking and start doing.

The goal for ISPs in this event — to have 1% of their residential customers connected via IPv6 by June 6 — seems minor given that 99% of their customers will still be on IPv4. Why is the bar set so low?

If you talk to a service provider, they won't feel that it's a low bar. It's actually somewhat of a stretch goal. To get to 1%, there are a lot of actions in play in terms of making sure the network is ready and customers are set up. The 1% is a number set to drive real traffic.

Content providers want to know that users will be able to reach them over IPv6.

Some major U.S. ISPs are conspicuously absent from the list of ISPs participating in this event. Does that mean they are behind in IPv6 deployment?

No, I wouldn't read it that way at all. Really, the way to read the list of participants is that it is a group of ISPs and content providers that were willing to step up and make the statement today.

Some participating sites are already supporting IPv6 at secondary sites. How significant of an effort will it be for them to turn IPv6 on for this event?

In any content provider company, the goal is to serve content reliably and effectively to as many users as possible. When they bring any update to their front door, they are committed to support it commercially, 24/7, for all of their customers. They don't want to play with experimental lab projects. So turning it on at the front door is signaling that IPv6 as a commercial service is ready to go forward.

What's been going on behind the scenes at websites like Google and Yahoo since they participated in World IPv6 Day?

A lot of what needed to happen for them to turn on IPv6 on their main websites happened on June 8 last year. It was clear then that it was feasible to run IPv6 in a commercial way. A lot of the activity since then has been focused on making sure it was introduced into the regular operational streams for all parts of their front doors. Although there were a lot of sites that came on last June and stayed on last June.

Why is it important for the Internet

engineering community to have home gateway vendors like Cisco and D-Link participate in this event?

It's a critical piece in making sure that if an ISP provides IPv6 access, that their users can use it. There has been a lot of inherent IPv6 capability in the global Internet that hasn't been tapped into because of missing links between ISPs and home users. The CPE piece is absolutely critical.

What will ISOC be doing between now and June 6 to attract other participants to this event?

We are going to make sure that as many different service providers, content providers and CPE vendors are aware of it. ISOC has five regional bureaus around the globe, so we will be reaching out to more regional providers. We're working with our 100-plus chapters and individual members to foster various events around the globe related to IPv6.

What should enterprise network operators be taking away from the announcement of this event?

I'm hoping that they'll take away the fact that IPv6 is really ready for commercial use. There are services available to them, whether ISPs or CDNs or any other form of support for their activities. Also, hopefully this will help them step up their own priorities with regard to IPv6 deployment. I'm hoping this June 6 date is a bookmark so that other organizations will start moving in this direction and start putting stakes in the ground.

What is the risk for an enterprise network operator that does nothing with IPv6 this year?

It really depends on the extent to which they are focused on growth and being accessed cleanly and robustly from all parts of the world. Increasingly, networks from Asia are IPv6 because Asia is all but out of IPv4 addresses. A network operator that does nothing with IPv6 is ensuring those users from Asia will be accessing their website through some translation services. If an IT organization does nothing with IPv6 in 2012, they may have a very busy 2013 as the ramifications and implications of network address translation between IPv4 and IPv6 comes home to roost for them. ■



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TOOLS

AirPrint to almost any printer

Back when I was young printing was complicated. Printer drivers were a nightmare of options and standards were rare. Now there are all sorts of standards for printing but the nightmare still continues. Even printers that sell for \$50 have multiple drivers, often support various printing protocols, have multiple driver updates, and then there is the printer installation software.

Today most printers come with some kind of installation program and unless you're very careful you'll find a raft of bloatware installed along with your printer. There's something weirdly eccentric about the whole printer business.

Anyway, my focus today is the latest novelty in the world of network printing: Apple's AirPrint.

In 2010 Apple finally included something that we'd been waiting for: A way to print from iPads and iPhones. This feature called Air Print initially only supported 12 printers which were all in the HP Photosmart Plus e-All-in-One series, a range of stand-alone printer, scanner, fax and coffee-making devices (OK, I lied about the coffee-making ... it was really tea-making).

Since then Canon and Epson have both added AirPrint support but there are still many, many printers that aren't AirPrint compatible. So, what do you do if you are an iPhone or iPad owner and don't have one of the anointed printers? Do you go and buy yet another printer?

No! The answer is to get a Lantronix

xPrintServer (see tinyurl.com/c2fbo6a).

The xPrintServer is a small device (0.875 inches by 2.25 inches by 4.5 inches) with a cool glowing "X" on the top surface. You plug in the power adapter, connect the xPrintServer to your Ethernet network, and off it goes. After a few minutes, the glowing "X" on the xPrintServer will start to slowly pulse and it's ready ...

The xPrintServer implements the Common Unix Printing System (CUPS) and, when it starts up, it scans your network to find all of the printers presenting the HP JetDirect interface (also called AppSocket), the Line Printer Daemon (LPD) Protocol (specified in RFC1179) or the Internet Printing Protocol (IPP) (specified in several RFCs starting with RFC2910).

CUPS handles all of the ugly details of translating images, text, PDF data and HP/GL data into formats that the various supported printers can output and the current printer compatibility list can be found on Lantronix's website (see tinyurl.com/7fsakkg).

The xPrintServer provides a



Mark Gibbs' Gearhead

Web-based administration interface so that you can update the firmware, configure printers and manage print jobs, but the truly beautiful thing about this product is that you may never have to do any configuration at all.

You plug the xPrintServer into your network, power it up, and within minutes you'll be able to print from your iOS device to almost any printer whether or not it directly supports AirPrint.

Under iOS in any application that supports printing you just tap the "action" button (that's the one with the arrow coming out of a square), tap the "Print" button, select an available printer, configure any available options displayed, and voila! That's it.

This has to be one of the simplest, cleanest and most painless products to use that I've seen for a long time.

Lantronix recommends an xPrintServer for every seven to 10 printers on your network that you want to make available via AirPrint.

Priced at \$149, the Lantronix xPrintServer will ship in February and gets a Gearhead Rating of 5 out of 5. ■

Gibbs outputs in Ventura, Calif. Your printable thoughts to gearhead@gibbs.com.



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GADGETS

Galaxy Nexus smartphone a worthy upgrade



Keith Shaw's
Cool Tools

THE SCOOP

Galaxy Nexus smartphone

by Samsung (Verizon Wireless service), about \$300 (with two-year contract, plus voice and data plans)

► **What it is:** The Samsung Galaxy Nexus is the latest Android smartphone from Samsung, utilizing the new Ice Cream Sandwich (Version 4.0) operating system from Google and running on Verizon's 4G LTE network. The phone has a very thin 9.47mm profile and a 4.65-inch Super AMOLED display, making it larger than the Apple iPhone 4 or 4S smartphones. The Nexus is powered by a dual-core 1.2GHz processor and includes 1GB of RAM to run apps that can be downloaded from the Android Market. The phone can store 32GB of data files, including music, movies and photos. An 802.11n connection lets you connect to a Wi-Fi network if you don't want to utilize the 4G or 3G network.

► **Why it's cool:** The new OS has some redesigned features, including a lock screen, homepage screen and an improved phone app. The 5-megapixel digital camera includes 1080p video capture and a panoramic photo mode that lets you take almost-360-degree photos. A front-facing 1.3-megapixel camera allows for video chat or self-portraits.

If you or your users are completely in the Google camp with its apps (Gmail, YouTube, Google Maps, Google Music), the smartphone completely integrates with those offerings — after signing in with my Google account, each of the Google apps quickly synchronized with my data from those services.

In my tests of the Verizon 4G LTE network (with the Speedtest.net app) in a

few different locations, I achieved an average of 18.13Mbps of download speed, and 6.48Mbps of upload speeds. This is super-fast compared with existing 3G phones, and even surpasses some home broadband speeds (especially my lousy cable service at home). In addition, you can use the phone as a mobile hotspot, allowing up to 10 devices to connect to access the 4G network.

The fast network speeds made it much easier for me to upload video from the phone to YouTube and Facebook. For example, a 30-second clip of my kids at 1080p resolution had a 27MB file size, which would take several minutes uploading over a 1Mbps 3G connection. With the 4G network, it took less than a minute. This opens up more opportunities for sharing video with others, rather than having them sit on the phone or transferring them to a PC for sharing later.

► **Some caveats:** With speeds like that, it's easy to fall into the trap of utilizing the 4G speeds instead of relying on your home broadband and Wi-Fi network, but the 4G speeds come at a cost with bandwidth caps from the carrier. For most of the apps, using Wi-Fi at home is preferable, and won't incur those data charges. But if you're out and about and have good 4G LTE coverage, you won't be disappointed by the fast downloads and upload speeds.

► **Bottom line:** While many smartphone users continue to wait for a 4G LTE iPhone, Android fans can already experience the next-generation speeds of 4G LTE on an advanced OS. If you have been considering making the switch from the iPhone to Android, the Galaxy Nexus is a great phone to consider.

► **Grade ★★★★★ (out of five).**

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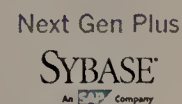
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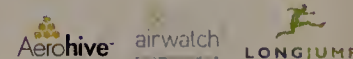
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CLEAR CHOICE TEST: SOLID-STATE DRIVES

SSDs deliver security and speed

Other World Computing (OWC) wins performance test with otherworldly results

BY TOM HENDERSON

Vendors are touting solid-state replacement drives as a way to protect corporate data in the event of a laptop being lost or stolen, and to boost performance at the same time.

We tested five SSDs to determine if they, indeed, were encrypting data and if the encryption could be somehow broken. In other words, were they safe to use if the device were stolen from or with a notebook?

The answer is: Summoning our best tools, we could not crack their encryption. Not only that, these drives delivered read and write speeds that were up to five times faster than the hard drives that came with our enterprise-grade laptops.

The products under test were 2.5-inch, SATA-3 replacement drives from Other World Computing (OWC), OCZ Technology, Micron Technology, Adlink Technology and Intel.

All of the drives passed the encryption test

with flying colors. When it came to performance, the OWC Pro 6G was fastest, running at sometimes five times the speed of the 500GB Hitachi drive that came with our Lenovo laptop. While OWC took the prize, all of the SSDs worked at several times the speed of our baseline hard drive.

Encryption options

Notebook hard drives can be encrypted via either software or hardware methods.

For example, tools like Microsoft's BitLocker offer operating-system level software encryption. With this method, the resident operating system can encrypt files, folders, whole disk partitions, or even the entire disk. However, this could leave file system information like names, ownership and location intact or predictable.

If the master boot record (MBR) is available and isn't encrypted, forensic work

can start to attack the contents of the drive because much of the file and data formatting becomes known — although decryption is still difficult.

If the BIOS "HDD Master" and/or "HDD User" passwords are set, the drive's MBR becomes encrypted, and a usable forensic analysis path becomes unavailable.

There are also many third-party encryption vendors that use their own software-based encryption seed or methodology, while others may use Trusted Computing chip hardware resident in the machine to encrypt.

In addition, most PCs have BIOS settings



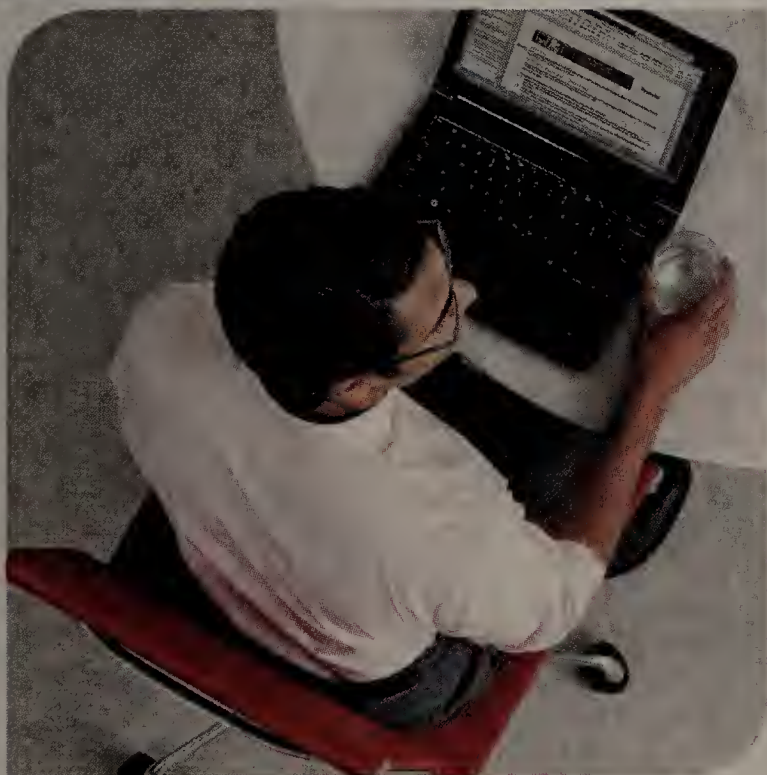
SSDs deliver smoking performance

We used CrystalDiskMark 3.0.1 disk benchmark tool on Windows 7 Enterprise to measure the speed of both sequential and random reads and writes using a 200MB file. We did a total of 12 runs. Here's a representative sample. We also ran the same test using the Hitachi drive that came with our laptop to compare traditional disk drives with solid state drives.

	Hitachi HDD HAD	OCZ SSD Deneva	Intel 320 SSD	Adlink SSD	Crucial M4 SSD	OWC Pro 6G SSD
Sequential Read (MBps)	97.144	461.217	264.291	439.286	388.421	551.292
Sequential Write (MBps)	102.37	294.461	213.082	314.604	219.72	332.656
Random Read 512KB (MBps)	31.938	418.245	171.642	276.903	319.289	429.223
Random Write 512KB (MBps)	38.949	289.768	196.989	308.098	277.263	321.191
Capacity (formatted/unformatted)	500GB/481GB	240GB/230GB	320GB/300GB	256GB/248GB	256GB/248GB	480GB/460GB
Price	*	\$650	\$500	\$428	\$424	\$1,040 (240GB=\$448)

*Hitachi pricing is not included because the Hitachi hard drive came with our test laptop and served as a baseline for our performance tests.

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that allow them to use SATA or SAS (Serial ATA and Serial-Attached-SCSI, respectively) encryption that's been available for roughly the past dozen years. We chose drives that use the BIOS method (to make things operating-system agnostic) to answer questions regarding the encryption safety of replacement drives.

Each of the drives came encrypted with the SATA master and user encryption keys enabled and hashed, so that they weren't readable until a BIOS command was used to set the passwords for each.

SATA and SAS drives and traditional mechanical drives, or SSDs, use a hierarchical command set to encrypt data on the drive. If the drive is removed and placed into an identical machine lacking the encryption key (set in the BIOS), the drive is unreadable, as though it were blank or filled with random data, with no partition table or other recognizable partitioning or boot sector information.

Behind native SSD encryption

The concept is that if a notebook is stolen, then a BIOS password could protect the machine from someone booting it in any way. In the bad old days, a thief or forensic expert would remove the drive from a stolen or captive machine, then boot it on another machine, where its contents potentially would be revealed. If files were encrypted, then small

files would be attacked until the key was revealed. The key would in turn be used to reveal the contents of the rest of the drive.

Hard drives potentially had the encryption key stored on the controller logic board atop the hard drive mechanism, and by replacing the controller board with a fresh controller, the contents of the drive might be able to be revealed unless other, additional content encryption methods were used.

Much of the SSD encryption relies on the BIOS, and while we used a Lenovo T520 notebook with a standard Intel i5 chipset, behavior of other BIOS software may vary from our results. That said, all of the SSDs we tested were fully encrypted, so far as we can tell, and we know of no forensic tools that can read either the factory-set Master or User passwords, so as to be able to decrypt the contents of the drive by any other means. Trust us, we tried. Overall, were we to pick one, it would be the fastest for the least cost, although we did appreciate the cloning tools sent with the Micron Crucial M4. We can't say if a three-letter U.S. agency has a method that we don't know about that can decrypt a drive forensically, but we couldn't do it. ■

Henderson is managing director for ExtremeLabs, of Bloomington, Ind. Henderson can be reached at kitchen-sink@extremelabs.com.

How we did it

We used two identical Lenovo T520 notebooks, that use an Intel i5 chipset, as our test bed. We used a network boot to load a copy of Windows 7 onto the notebook after we entered HDD Master and User passwords onto each drive and formatted them for NTFS.

We used several tools including Linux hdparm, (gs)smartctl and SpinRight, and none were able to read or decrypt any of the drives after we moved drives to the alternate T520 notebooks.

We were unable to disassemble the firmware on any drive to find a password we'd set in clear text. We did not open any drive and try to fetch passwords from chips internal to the drive assembly. All attempts at obtaining any information about drive contents without passwords were thwarted; we could not read the drive data without them.

HERE ARE THE INDIVIDUAL REVIEWS

Other World Computing (OWC) Pro 6G

It arrived in a small blister pack, and worked as described. We installed it into our Lenovo T520 notebook, set passwords in the T520 BIOS, restored our test bed version of Windows 7 into it and proceeded to test it with CrystalDiskMark.

It blew the rest of the drives away, performance-wise. We then yanked the drive and proceeded to test it in our other T520, which was identically configured, but without passwords. We used Linux hdparm to try to make the controller find hidden areas on the drive (there were none) and we could not find any pattern to the data on the drive. We saw no reduction method or pattern that would give us any clue as to the contents of the drive. We could only use the ATA Erase Unit after we unlocked the drive in the T520's BIOS.

This no-frills drive came with no additional software or cables or even a data sheet, but it out-performed all of the other drives we were sent, almost six times as fast as the native drive of the T520, the Hitachi 500GB TK500-500 conventional drive.

It's tough to argue its performance. The capacity of the drive, formatted, was about 460GB, as reported by Windows 7.

OCZ Deneva 2

Like the OWC, the Deneva 2 drive was very fast. It otherwise behaved almost identically to the OWC, save it was a tad slower. No additional software arrived with it, and it formatted to 230GB, as reported by Windows 7.

Micron Technology Crucial M4

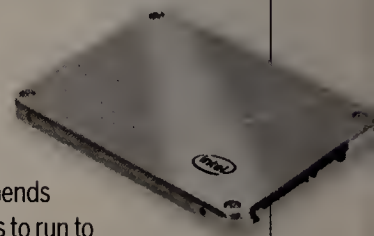
The M4 came more prepared to do work than the others. The box arrived with a USB-SATA3 cable and a CD that can be used to clone an internal drive, then transfer the data on to the newly installed M4. We tried this, and it went without a hitch, although the USB 2.0 interface and driver isn't blazing, so copying large drive capacities can take time. We timed about two hours for our artificial 120GB test drive load. The instructions for transferring data were sparse, but we figured out the Windows-only software.

Adlink Technology ASD25

Adlink's drive performed in the middle of the drives tested. No special software was sent with the drive, but it installed normally and could not be decrypted, much as we tried. As this was one of the first drives to arrive, we paid it special attention and pounded it every way we could find. It remained a mystery, unless the BIOS HDD passwords were correct. It formatted to about 248GB as reported by Windows 7 and was sent as 256GB.

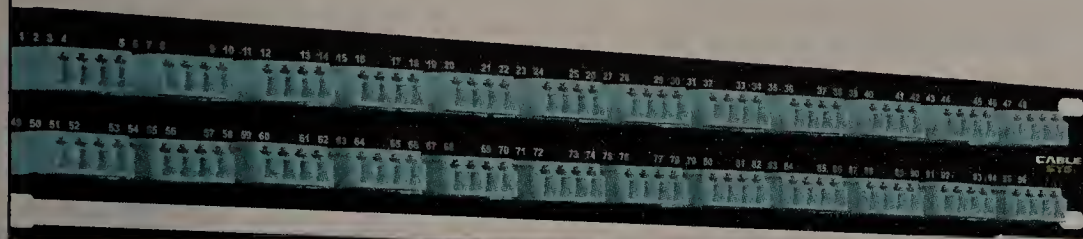
Intel 320 Series

The Intel SSD drive was fast, but in the midrange, still well more than twice as fast as the native conventional drive of our test unit, the Lenovo T520. Intel also has some online tools that "optimize" the drive, and recommends that the tools be run weekly; they take only a few seconds to run to completion. The Windows-only drive tool can also Secure-Erase the drive, which rewrites the SSD; the software also worked with the other drives we tested. The drive formatted to about 300GB as reported by Windows 7.



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Windows 8 breaks new ground

Microsoft unifies operating systems from the smartphone to the server

BY TOM HENDERSON

The first public beta for Windows 8 is expected to be released in February, but we've been testing pre-beta code in our lab. Our overall impression is that Windows 8 represents an aggressive effort by Microsoft to deliver a single OS that runs just about everywhere and takes on all of Microsoft's key rivals.

There's a tablet edition that targets Apple's iPad, a server edition with virtualization features aimed at VMware and a smartphone OS to challenge the iPhone and Android markets.

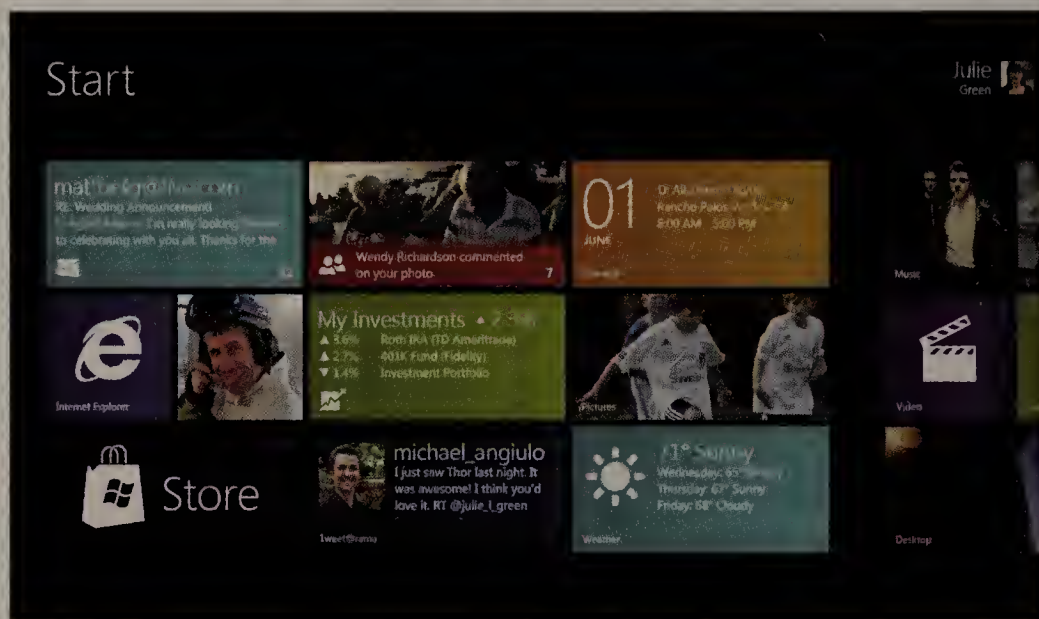
Over the years, Microsoft has gone back and forth on having more than one code base for its operating systems. Windows started with two versions, one that ran on DOS and another that ran natively on hardware. These two code bases were united in Windows 2000, but were separated in the Windows XP versions, Windows CE and Windows Server.

Windows 8 attempts to run a similar kernel across target devices once again. Eventually, Windows 8 will run on smartphones and tablets through notebooks and desktops (although there is currently no publicly released code called Windows 8 for Windows Phone). Server versions run from static server devices to more modular Windows Server 8 constructs targeted at hypervisors.

Microsoft very much wants the world to use its Hyper-V hypervisor rather than VMware and Windows 8 targets VMware features. Microsoft also places a strong emphasis on Windows 8 fluidity on hypervisors, adding data center administrative controls, as it targets platform as a service (PaaS).

We tested Windows 8 on a Samsung Galaxy tablet, on Lenovo notebooks, on HP desktops and as a virtual machine with Parallels on a Mac. We tested server versions on HP servers running native Microsoft Hyper-V and also on VMware vSphere in our lab, and in our network operations center cabinet at nFrame in Carmel, Ind.

CLEAR CHOICE TEST



Windows 8 features a tile-style Start screen.

Only rarely, and under high pressure, did it explode — and then, only on the Lenovos when we pushed it hard. The client side is interesting, but we found the Windows Server 8 changes and additions are more compelling.

Client and controversies

There are now two directions for Windows UI in Windows 8, and two directions for CPU support in the client versions.

Microsoft introduced the Metro UI first with Windows Phone 7 and is now extending Metro to other touchscreen-capable devices like tablets. Metro is an “active frame” icon-based UI and system that doesn't run traditional .Net Framework or Silverlight apps. Today, Metro is available on tablets and smartphones, but Microsoft plans to extend Metro to other platforms.

With Windows 8, Microsoft adds support for ARM family processors, currently 32-bit CPUs poised toward smartphone and tablet devices. Market demand for servers also based on ARM (example: from HP's Moonshot ultra-high density CPU project that runs high densities of ARM Calxeda CPUs), may mean that Microsoft ports and evolves server-based support for ARM as well.

Two kernel trees would then evolve, one for x86/64-bit Intel-like CPUs, and one for ARM designs. Porting issues and application compatibility issues for Metro remain — you can't run Office as we know it on Metro.

The Samsung “Developer Tablet” we tested used an Intel “Core i5” chipset, and ran the Metro UI. Apple currently also supports both families of CPUs, and bases most of its sub-notebook devices on custom ARM devices and millions of iOS-based applications run on ARM application development frameworks.

The Metro user interface is simple and uses a tiled window front-end and brings icons to the foreground quickly. Currently, there aren't a huge variety of applications to choose from, but we were impressed with speed, and were able to understand maneuvering back and forth through applications.

Our experience with Windows Mobile 7.5 (tested on a Samsung/AT&T smartphone over Wi-Fi) was very similar, and the learning curve was minimal.

Windows 8 notebook clients were fast, but we found them to show signs of their alpha origins, especially when we used the Internet Explorer browser on streaming media. We used healthy notebooks with 4GB of user memory.

We additionally had trouble with hibernation mode, and if we had many concurrent video streams working in IE, then closed the notebook, we could have trouble bringing the notebook out of hibernation; sometimes it would lurch, as though it were a steam engine coming up to speed, and sometimes preloaded IE Flash-based (YouTube) video streams would just stop until reloaded. But this is pre-beta software.

The notebook-based client also had working power-savings modes that spoke to the Intel i5-based chipset used by our Lenovo T520 notebooks. We watched power climb backward on our power measurement devices exactly on cue. We were able to install Windows Office, and also tried a few of our games. We could not find Windows XP compatibility mode, and when we

attempted to install older versions of Microsoft Office — ones compatible with XP but truly out of date — they would not work. Undoubtedly, some software will work, but compatibility modes couldn't be located.

Server Core

The server editions of Windows 8 start in a “headless,” PowerShell-driven version called Server Core. The older GUIs are still around for what Microsoft calls “backward compatibility.” We found that after some experience, the GUIs can get in the way.

We carefully considered this, as there is a generation of Windows administrators who have evolved along with the Windows Management Interface instrumentation, including Microsoft's Management Console, and interactivity between different components and objects. None of that has been lost, and reminds us of Windows 2008 R2 navigation and behavior when we used them.

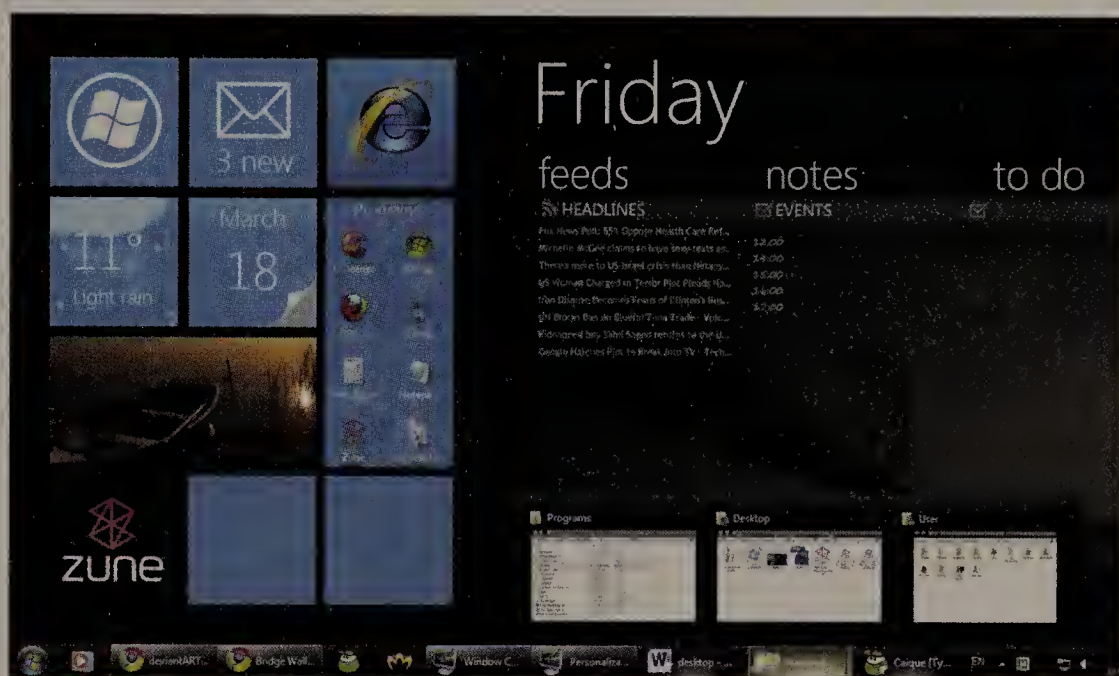
Server Core is simpler and more compelling, in terms of deployment and management of Windows 8, we feel. PowerShell now has more than 2,300 commandlets. Quick-and-dirty work, using the PowerShell and modifying basic script behavior, was found to be both familiar and decidedly more consistent than using the myriad Unix/Linux/Solaris equivalents, because of syntactical consistency among the PowerShell commands.

There is an equivalent to looking things up in *nix “man” pages to find the correct syntax, and it's more consistent, but in a Microsoft and Active Directory control idiom. It's like learning Spanish after Latin, we decided.

What we could do is comparative magic, as policy control has been expanded. As an example, we could sculpt a share policy, and have it go to all appropriate Active Directory nodes (our two test clients) at once. Ostensibly, such policy changes would be carried through a network at the speed of the transport. This also means that administrative controls must be ever more highly authenticated as a single PowerShell directive could stop every node on a network cold, if inappropriately executed, as fast as the network could carry it. With such power comes great responsibility.

Storage virtualization

The Windows Server 8 editions promise features that are often found on storage arrays apps such as those from NetApp and EMC. We were intrigued by the capacity for heuristic deduplication. This feature deduplicates



The Metro user interface is optimized for touchscreen devices like smartphones and tablets.

files, a process that creates file system stub pointers to source files. The secret sauce is that Windows Server 8 does this by comparing more than the usual metadata characteristics, such as file size and name. Instead, other factors are also said to be chosen although we were unable to exhaustively test how this works.

Windows Server 8 also now creates the virtualized storage pools, called Storage Spaces, similar in nature to what we found in VMware 5. These “elastic” (actually capable of high oversubscription) storage pools are designed to permit virtualized or static server instances to have resources appear larger than they actually are, cutting the cost of actual (eventual) storage deployment by “fooling” applications.

Windows 8 accomplishes this through a bus, the Windows Storage Management API and associated WMI instrumentation, to corral all of those wily third-party storage vendors. We touched the storage API sets, but we lack software glue for our Dell Compellent Storage Array to be able to get the “final feel” for the enhancements. Microsoft will need to encourage third-party providers to support their new capabilities with zeal.

Cloud and multi-tenancy

Windows Server 8 is designed to be perceived, in our opinion, as a Windows PaaS component. Microsoft claims much has been done to make instances of Windows Server 8 more modular, and a better fit as an instance tenant in multi-tenant environments.

Toward those ends, the instance needs to be predictable, movable (so as to optimize performance and ally hardware assets) and manageable through WMI and System Center-based balancing algorithms. Connected pieces living across a service provider's NOC cabinets must also be secure, as should their storage and communications. Microsoft has paid a lot of attention to multi-tenancy considerations, although we lack sufficient infrastructure to be able to test all of the multi-tenant pieces, today.

The lack of drivers for our Dell Compellent SAN prevented us from testing the ability to have VM instances moved directly across storage arrays, rather than being dragged through servers. Unattended, predictable moves of instances to balance loads and availability is a strong function of VMware, and one of which Microsoft obviously is jealous.

Once this feature works, Windows Server instances will silently (and, it is hoped, effectively) move in and out of warrens of available resources without tying up network wires with movement activity. SAN controllers would be instructed to move the newly redesigned back and forth through hardware infrastructure to match the variables of periodic load need versus availability.

Microsoft also supports a Hyper-V Virtual Switch, which serves as a virtual Ethernet layer liaison with network I/O. The hypervisor stack, with the Hyper-V Virtual Switch, is designed to provide network interface card (NIC) teaming, but also programmable links with other servers in perhaps distant

cabinets in a data center, forming and controlling relationships among "team components" in a multi-tenant environment.

Inside the Virtual Switch are layers designed to perform virtual NIC control for member VM instances, traffic management (especially load balancing and traffic shaping by protocol throttling) and overall platform I/O control. Interestingly, there are said to be places for packet inspection/traffic monitoring, but we don't have a way to test this feature; it might be there for fire-walling protection of assets, but it might be a set of nodes to ally policy controls, too. QoS and stream control (through protocol tagging and admittance throttles by protocol) should also be able to be managed in the Virtual Switch.

In the same vein, Windows Server 8 supports DNSSEC, the authenticated version of DNS, and Active Directory is highly dependent on DNS. Establishing trust and validation was comparatively simple for DNSSEC resolvers in our rudimentary test. Trust

relationships are set up using secrets among authorities, then the very top Start of Authority becomes a validator for subdomains.

Our Windows 7 clients could update it satisfactorily, but we were unable to get Macs (OS X 10.5) and Samba-based Linux (Samba 3.2 on Linux 2.28.30) clients to perform Dynamic DNS (DDNS) updates to the server, but this problem is an issue that would undoubtedly be rectified by a release candidate of Windows Server 8.

Compelling and not

We can't speak to performance, because the numbers will change at least two more times between our pre-beta exam and the final product, which is slated to ship in October. The client version of Windows 8 seems less compelling to us than the server version. The fact that there becomes two UIs to support, and a third if you count what you already own, seems a bit daunting in the face of no strong compelling applications to drive the use of clients.

The server side, however, is a long litany of interesting answers to competitive add-ins, add-ons and revenue generators atop Windows 2003 and 2008 Server platforms. Microsoft has carefully crafted an avenue back toward Hyper-V, and away from vSphere and XenServer.

Microsoft's perfect world is a walled garden where one uses convenient Microsoft infrastructure, and the company makes a compelling case toward corralling advanced features back toward itself with comparatively visionary release components.

There's also an enormous bow toward the admin geeks of the world with the inclusion of PowerShell management capabilities, and a seeming admission that consistent shell behavior can trump highly evolved GUI management systems. ■

Henderson is managing director for ExtremeLabs, of Bloomington, Ind. Henderson can be reached at kitchen-sink@extremelabs.com.

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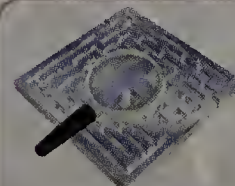
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No SOPA blackout? We know who you are

LAST WEEK a number of major websites went “dark” to demonstrate their disapproval of The Stop Online Piracy Act (SOPA) and Protect Intellectual Property Act (PIPA) bills, the flagrantly unconstitutional bills that received the uncoveted Grand Gibbs Golden Turkey Award for 2011 in November.

All U.S. Wikipedia users, for example, were routed to a black page with a message protesting the legislation. And other sites staging similar blackouts included Reddit, Mozilla, Twitpic and, I am told, the Cheezburger network and a Harry Potter themed game site called “Hogwarts New Zealand” (honest).

On the other hand, Google’s blackout was purely symbolic with a black band redacting Google’s logo on the company’s U.S. homepage ... cute, but hardly as “in your face” as if they had actually stopped serving searches or inserted interstitial protest message pages.

Google’s official comment was, “Like many businesses, entrepreneurs and Web users, we oppose these bills because there are smart, targeted ways to shut down foreign rogue websites without asking American companies to censor the Internet.” They should have added, “Just don’t expect us to lose any revenue if we can possibly avoid it.”

For Facebook and Twitter it was business as usual. Twitter CEO Dick Costolo wrote, “Closing a global business in reaction to single-issue national politics is foolish,” while AOL stated, “We are not adjusting the consumer experience on our properties tomorrow, but we will be helping to drive awareness of key issues around these bills to our users.” Their “consumer experience”? Right. Sure.

Facebook also opted out of the blackout with CEO Mark Zuckerberg issuing a weak, hand-waving statement that I won’t waste your time on. Way to go, Zuckerberg.

The Motion Picture Association of America, of course, loved the uneven support and commented that “resorting to stunts that punish their users or turn them into their corporate pawns, rather than coming to the table to find solutions to a problem that all now seem to agree is very real and damaging.” The solutions that the MPAA wants, of course, are SOPA and PIPA.

In a spasm of irony so ridiculous as to be funny, MPAA’s chairman and CEO, former Sen. Chris Dodd, wrote of the blackouts, “It is also an abuse of power given the freedoms these companies enjoy in the marketplace today.”

Words almost fail me. Here we have huge public and industry opposition to legislation that is staggeringly, stupefyingly, unequivocally bad for the Internet, bad for business ... in fact, bad in just about every imaginable way, yet major Internet industry players just carry on chasing profits and think that their contribution to the opposition movement, i.e., simply paying lip service, was adequate.

To all of the companies that didn’t display their opposition by observing a blackout, who handed out weasel words in an attempt to justify their lack of real solidarity: We know who you are. If SOPA and/or PIPA passes, don’t think we won’t remember that you cared more about your profits than you did about our freedoms. ■

Gibbs is disgusted in Ventura, Calif. Your anger to backspin@gibbs.com.



We need a better definition of paperless

A LITERAL reading of this survey question leads inevitably to a pair of correct answers: absolutely yes and absolutely not.

The question: “Do you think the United States will ever be a paperless society?”

Ever? That’s a long time, so my answer is absolutely yes; everything happens sooner or later.

But a paperless society? As in no paper? None?

Absolutely not, at least not until someone figures out how to unring the bell; in other words, how to uninvent paper.

All of which is my way of saying I’m not sure how anyone could possibly answer the question — as posed — yet according to a press release from Poll Position, 1,142 registered voters gave it a go when contacted by robocall ... and at least 3 of every 4 had no trouble reconciling my inevitability and impossibility issues. The results:

- 56% said predictions of a paperless society aren’t worth the paper they’ll still be printed on — forever.
- 20% said a paperless society, undefined, is only a matter of enough monkeys writing enough Shakespeare.
- And the other 24% — otherwise known as the sensible people — either offered no opinion or said they didn’t know.

It would seem as though a definition of “paperless” might have helped. Wikipedia has a page for “paperless office” — note it’s office, not society — and opens with this definition: “A paperless office is a work environment in which the use of paper is eliminated or greatly reduced.”

Or greatly reduced? (More fudge, anyone?) By that definition I

already work in a paperless office: It’s been years since I’ve had a file cabinet, I surrendered my personal printer without a whimper, and there’s a reason I check my snail-mail cubbyhole about once a month.

Yet we still have interoffice mail, right after the holiday I peeled the shrink wrap off a 2012 desk blotter calendar (I have my reasons), and my business card still carries a telephone number for a fax machine they say is located somewhere on this floor.

Paperless? Not by a long shot.

Kids flip for Flip

Having recently read a *Network World* story about Cisco’s Umi being deader than the Wicked Witch reminds me to mention a personal experience with another of Cisco’s toe-tagged products: the Flip.

Ask my children and I am certain they would tell you that the Cisco Flip is the best Thanksgiving present they have ever received.

Thanksgiving present?

Yes, their Uncle Brian had brought one of Cisco’s dearly departed pocket video cameras to the McNamara family T-Day gathering ... and my three 10-year-olds had so much fun using it that Brian, sensing an opportunity to claim Favorite Uncle status, flipped it to one of them as he and Aunt Sheila were heading for the door.

Two months and a mountain of Christmas gifts later and the Flip remains a source of regular amusement.

You might think a company could make money selling such a popular gadget. ■

Comments? You could send a postcard, but buzz@nww.com works.

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A data visualization of emergency incidents in Madrid between 2009 and 2010

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